

# Integrated Stormwater Management Planning:

## Diverse Interests Unite Behind LID Approaches at Celebrate Virginia North



Presented by:



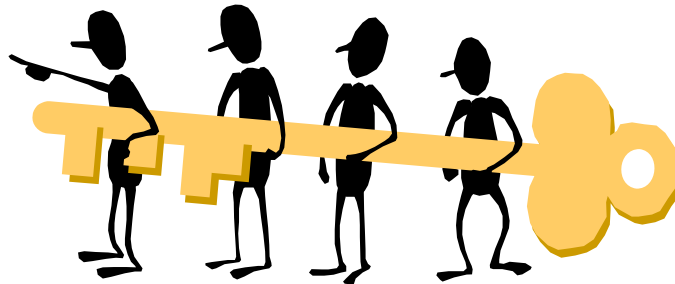
**Friends of the Rappahannock**  
Advocacy • Restoration • Education



September 22, 2004

# Stakeholders

- Silver Companies (Silver)
- U.S. Army Corps of Engineers (Corps)
- Williamsburg Environmental Group (WEG)
- Friends of the Rappahannock (FOR)



# Agency Coordination

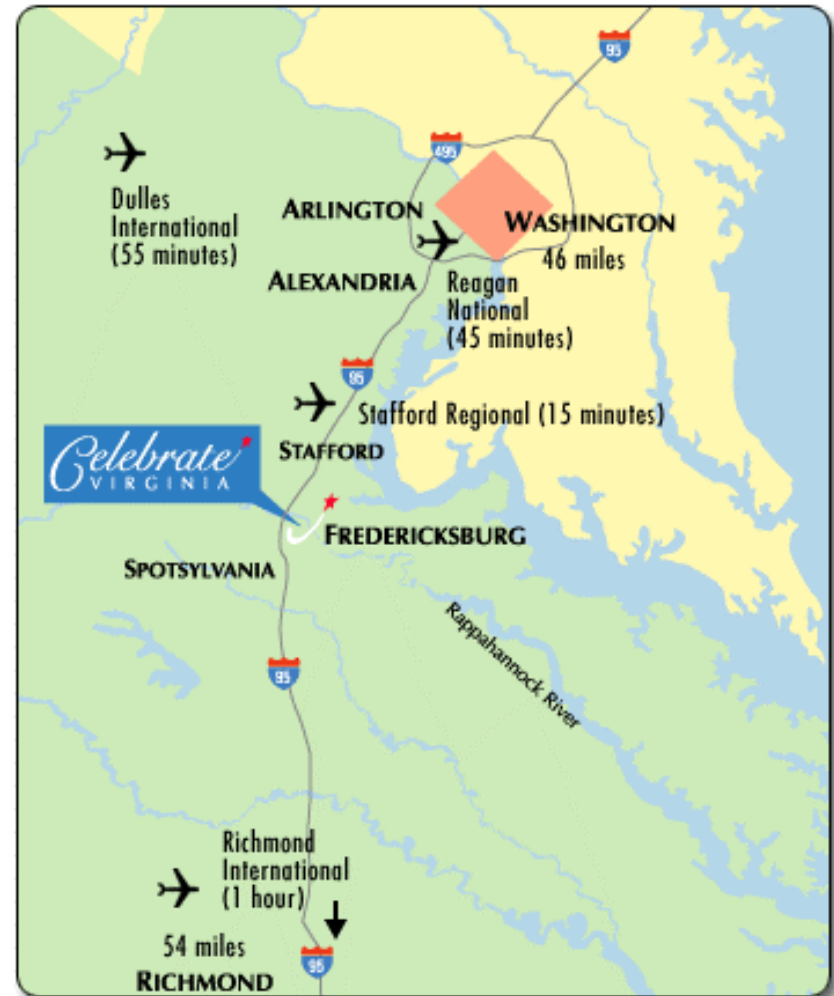


US Army Corps  
of Engineers ®



# Project Background

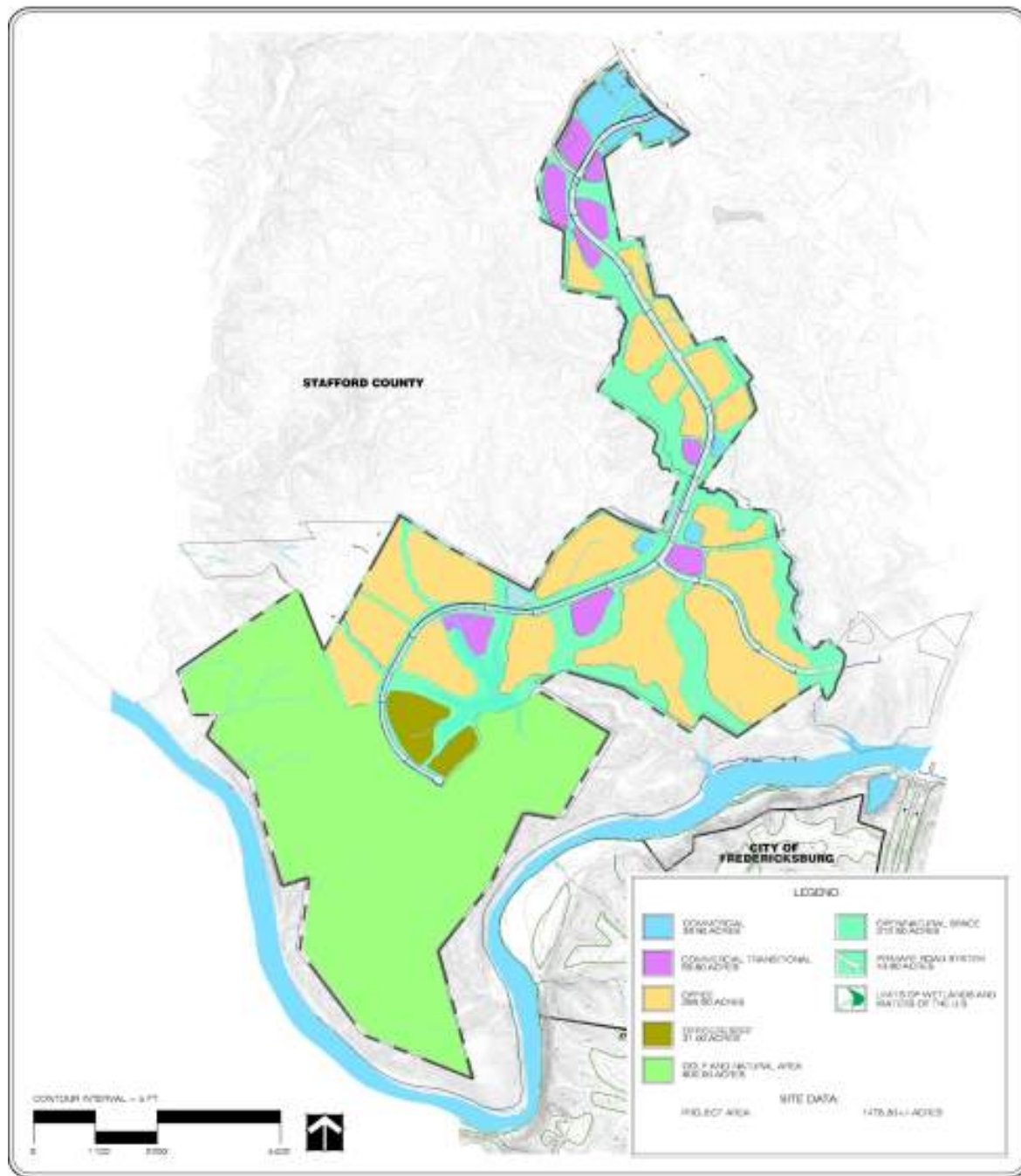
- Celebrate Virginia
  - North and South
  - Celebrate Virginia North
    - 1,478 acres
  - Stafford County
  - Office, Commercial, Residential, Golf



# Watershed Characteristics

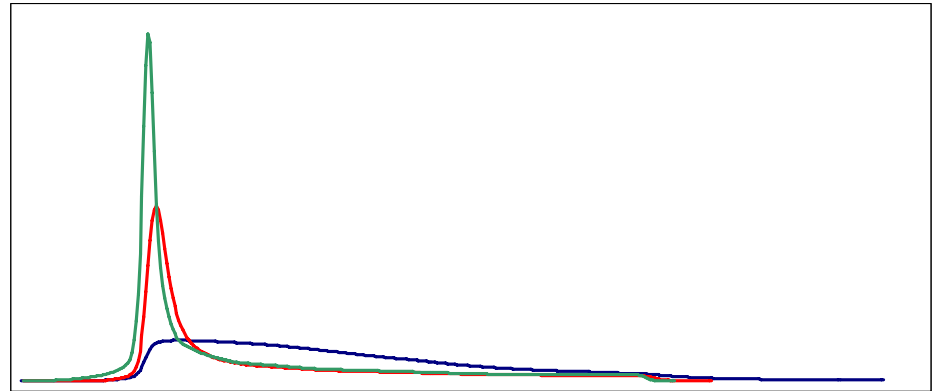
- Chesapeake Bay Watershed
- Rappahannock River Basin
  - State Scenic River
- England Run
  - Perennial tributary
  - Approximate 1,800-ac watershed
  - Celebrate Virginia = 420 ac of watershed





# Permitting Considerations

- Avoidance & minimization
- Impacts to aquatic environment
  - Direct and indirect
- Mitigation
- Goal: replicate the pre-development hydrograph of England Run





# Watershed and Regional Concerns

- Establish Rappahannock Watershed as National Model
- Round Tables
  - Local involvement
- Cooperative Progress with Developer/Engineers
- Demonstration Sites
  - Model development principles



# Water Resources Evaluation and Modeling

- Environmental Constraints
- Water Availability/Water Demand
- Watershed Modeling
- Stream Channel Protection Criteria

# Environmental Constraints

- Delineation of wetlands & stream channels
- Steep slopes
- Forest stand delineations
- Vegetative community surveys
- T&E species surveys
- RPA assessments
- Stream attributes assessments
- Perenniality evaluations



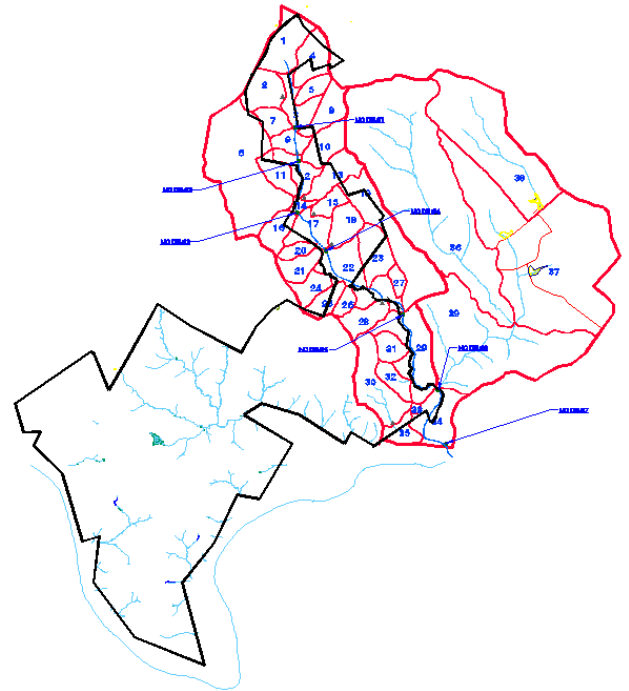
# Water Budget

- Balance available water supplies
- Evaluation of all possible water supply options
- Maximizing onsite lake storage and capture
- Recharge of irrigation lake
  - Flowby = 30% of MAF
- LID to help meet recharge targets



# Watershed Modeling

- England Run watershed
  - 39 sub-watersheds
  - HEC-1 hydrologic model
  - Regional stormwater management facilities
  - LID practices



# Stream Channel Protection

- Combination of regional and site-level BMPs
- Recharge facility
- Stream buffering
- Implementation of widespread LID practices



# LID Development Scenario

- Office



# LID Development Scenario

- Small Commercial





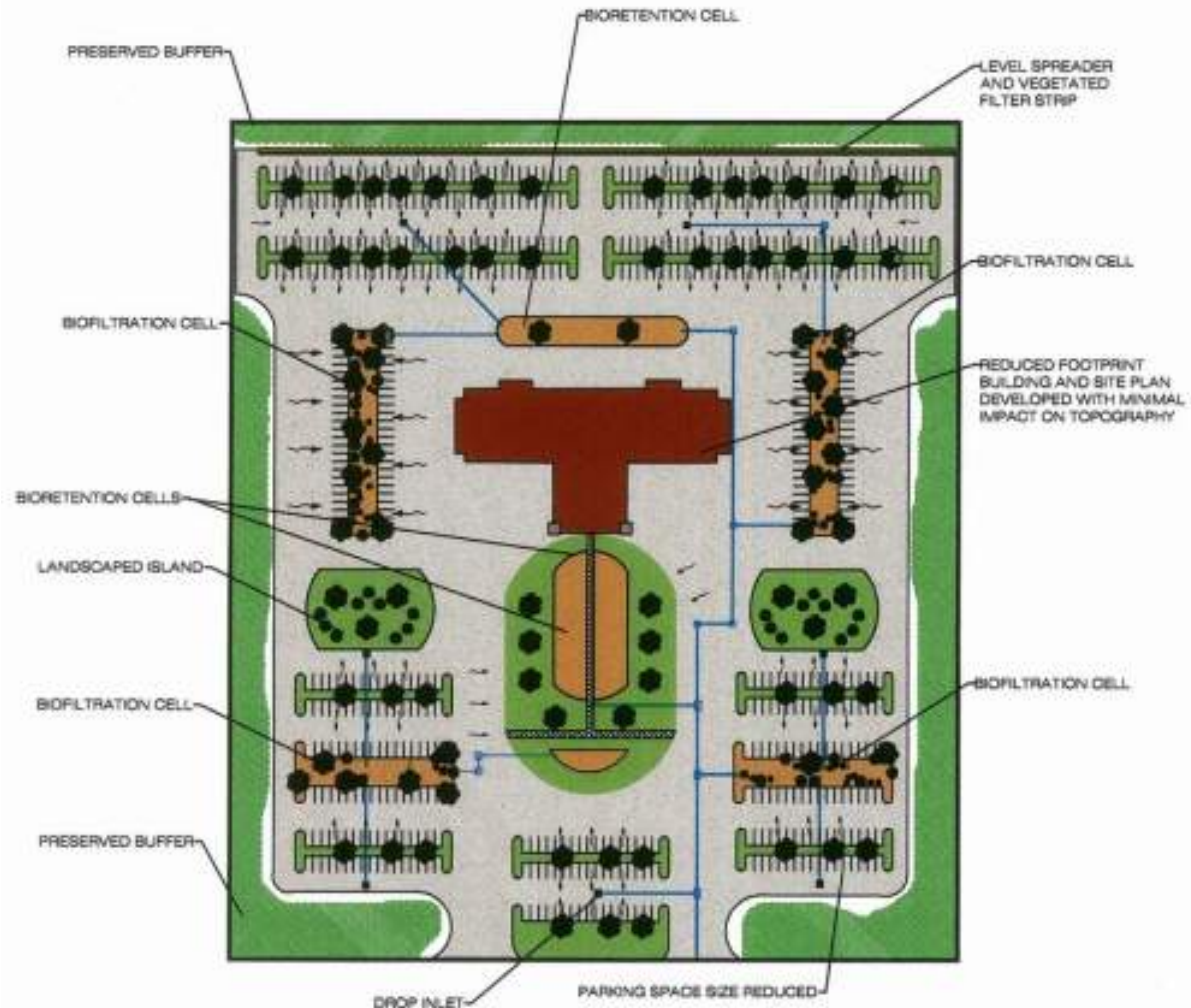
# LID Development Scenario

- Large Commercial



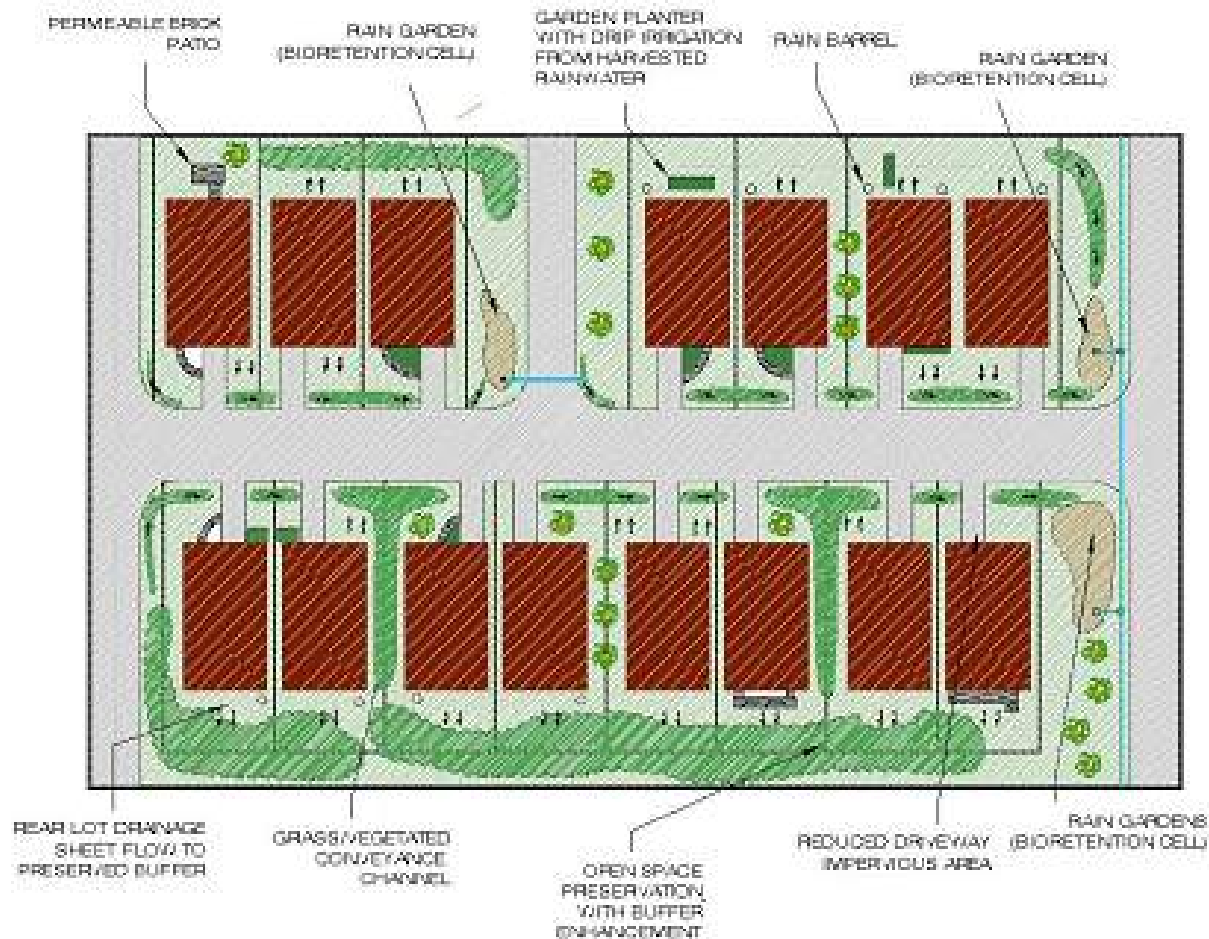
# LID Development Scenario

- Hotel



# LID Development Scenario

- Residential



# Owner Considerations

- Maintenance
- Character of the Development
  - Aesthetics of stormwater treatment
  - Planned land uses allow opportunity to incorporate LID practices
- Cost Comparison
- Time Value of Money

# Ongoing Efforts

- Implementation
  - LID Guidelines
  - LID Worksheet
- Water Quality Monitoring
  - England Run
  - Rappahannock River
- Lessons Learned



# Keys to Success

- Cooperation
- Willingness to consider concerns of other interested parties
- Stepping “out of the box”
- Site-specificity

